

## EZ HITCH

## BACKGROUND OF THE INVENTION

A new coupling system hitch between a towing vehicle and a towed trailer which is self-aligning, self-connecting, and which allows for maximum horizontal and vertical movement of the towed vehicle relative to the towing vehicle. Unlike the standard ball and socket hitch, the coupler ring hitch assembly consists of two fundamental parts: (1) a coupler ring guide and a housing, the latter having a rearward extending rectangular shaft for attachment to the towing vehicle by insertion of said shaft into a Class II or III trailer hitch channel; and, (2) a double-ring coupler assembly which is guided by a flanged coupler guide into a spherical housing. The coupler ring assembly is held in place by a coupler pin which extends vertically through the spherical housing and through the double ring coupler. Extending from and operatively associated with the spherical housing are flanged walls which diverge rearwardly guiding the coupler ring assembly into the spherical housing. The coupler ring assembly extends outwardly into a rectangular shaft which fits over and is bolted onto the tongue of a towed trailer. The coupler ring assembly consists of an inner ring which is geometrically similar to a lateral section of a sphere. The inner ring is housed within a similarly shaped outer ring in such a way that the outer ring is allowed to rotate three dimensionally about the inner ring thus allowing maximum vertical and horizontal movement of the tongue and towed trailer within the flanged walls of the coupler guide. The double ring coupler assembly allows a maximum and substantial improvement to the range of motion both vertically and horizontally of the trailer tongue and trailer.

## DESCRIPTION OF THE PRIOR ART

Nearly all of the prior art related to trailer hitch configurations involve the classic ball and socket hitch. Numerous attempts have been made to align the components involved in the connection between a towing vehicle and a towed trailer and efforts have also been made to physically guide the trailer tongue onto the ball component in order to ease the difficulty of backing the towing vehicle into engagement position with the hitch component on the towed vehicle. The following U.S. Pat Nos. are relevant to this invention:

U.S. Pat. Nos. 4,657,275

4,903,978

5,080,386

4,708,359

4,131,295

3,891,237

3,421,780

2,804,315

4,350,362

4,511,159

4,416,466

4,226,438

4,192,526

3,924,257

5,236,215

5,114,170

One of these provides a means for deflecting the trailer hitch socket into a constrained position and using the vehicles springs to urge the hitch ball up into the socket.

Others have used paired horizontally disposed elongated bars, a transmitter and receiver, and even magnetic coupling. U.S. Pat. Nos. 4,657,275 and 4,903,978 provide an aligning structure for a trailer hitch which includes a ramp to elevate the ball socket in relation to the hitch ball. U.S. Pat No. 5,080,386 improves somewhat over those two discloses a structure which not only guides the socket up over and aligns it with the ball, but has a pivoting slide plate which forces the trailer hitch socket down onto the ball rendering engagement. However, all of this prior art is somewhat complicated by use of the classic ball and socket hitching engagement means. Present invention disposes with the cumbersomeness of the ball and socket and thus eliminates the need for slide plates, support legs, release arms, necessary to force a trailer hitch component over and onto a towing vehicle hitch component.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide a new self-aligning and self-connecting double ring coupler hitch assembly between a towing vehicle and a towed trailer incorporating a simple flanged structure for guiding a double ring coupler smoothly into a spherical housing where it is locked into place with a coupler pin which falls, with the use of gravity, vertically downward through the spherical housing and the double ring coupler.

Another object of the invention is to provide a new trailer coupling mechanism, as opposed to the classic ball and socket, in accordance with the preceding object in which the trailer hitch component is guided smoothly into engagement with the towing vehicle component without reliance upon other forces such as vehicle springs, ramps, forward slide plates, and other components necessary to force one hitching component, such as a socket, onto another hitching component such as a ball.

Another object of the invention is to provide a hitch in accordance with the preceding objects in which the trailer hitch component consists of a double ring coupling assembly in which the outer ring moves three dimensionally about a fixed inner ring, and which also moves three dimensionally within a spherical housing component, thus allowing maximum movement of the trailer tongue and towed trailer vertically and horizontally within a continuous plane in relation to the rear of the towing vehicle.

These together with other objects and advantages which will become clear reside in the details of construction and operation as hereinafter are more completely described and claimed.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of the double ring coupler hitch assembly of the present invention.

FIGS. 2, 3, and 4 are perspective views of the double ring coupler illustrating the relationship of its components, specifically how the inner ring is housed within the outer ring, and how the outer ring with its extending shaft connected to the trailer tongue move freely about the inner ring.

FIG. 5 is a sectional view illustrating the engagement of the double ring coupler within the spherical housing with the inner ring locked in place by the coupler pin.

FIG. 6 is a perspective view illustrating the freedom of three dimensional movement of the double ring coupler shaft within the spherical housing and about the inner ring, thus resulting in maximum horizontal, vertical and rotational movement of the trailer tongue and hence trailer.